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Environmental Management and Higher Education: Are they Closely Related?

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Abstract

An empirical study was conducted to determine the relationship between higher education and environmental management. Through the multi-stage sampling procedure, the representative sample of 180 respondents were selected for the study. Primary data were obtained with the aid of questionnaire. Data were subjected to univariate probit regression analysis. Results revealed a positive relationship between environmental management and higher education. Findings showed that tertiary education was significant at one percent level suggesting that people who have acquired higher education were more likely to adopt and apply environmental management practices and techniques. Findings further revealed that the variable, no formal education, was negative and significant (P<0.05) indicating that persons without formal education were less likely to imbibe environmental management measures. Supportive policies and institutions which provide access to training and information (awareness and media sensitization) that will expand the opportunities of the poor to invest in environmental improvements are required. Policies to promote sound environmental management and protect the environmental assets through higher education would be a rational decision. The poor with low education must be seen first as part of the solution rather than part of the problem.

Introduction

Threats to environmental quality has continued to grow worldwide (Etim and Ofem, 2005). As population increases, the amount of waste generated increases correspondingly and the capacity to absorb these waste becomes more complex (Edet and Etim, 2014a). Managing the environment sustainably to provide goods and services on which human development relies on is necessary to ensure secure and equitable access to environmental assets. According to Schwarte (2008), poor people in developing countries often rely heavily on their immediate environment for their livelihoods and are most likely exposed to environmental risks and degradation and are usually the worst represented in relevant decision making processes. Due to their low education, they are particularly susceptible to environmental hazards like flood, drought, pest attack on crops and livestock and loss of biological resources which translate into loss of economic potential and numerous environmentally-related conflict.

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In Nigeria, majority of the poor reside in the rural areas and derive livelihood from farming (Etim, 2007; Edet and Etim, 2014a, Etim and Edet, 2014b, Etim and Ukoha 2010, Etim et al., 2011, Etim and Edet, 2016). Agriculture is human activity that affects the greatest proportion of the earth's surface (Pagiola and Holden, 2001) and largest single source of livelihoods and income (Ohlsson, 2000), especially, in Africa. But extensive agricultural growth is considered to be a major contributor to habitat loss and reduced environmental resistance that buffers agro-ecosystems against environmental and market shocks (Pagiola and Holden, 2001). Traditionally, the poor takes the brunt of the blame for causing society's many problems including more recently environmental degradation as it is generally believed that poverty is a major cause of environmental degradation (Amuyou et al., 2013), though, the non-poor also share in the blame. Mikulik and Babina (2009), noted that natural resources of the earth including the air, water, land flora and fauna and especially samples of natural ecosystems must be safeguarded for the benefit of present and future generations through careful planning or management. Unfortunately, these natural resources have been bastardized by man and poverty has propelled many families to over-use land and other natural resources. Nayar (2013) agreed that when these natural resources are over exploited, supplies is affected and managing imbalance demands assuming a slightly different approach. Therefore, changing people's attitude towards the use of natural resources is fundamental to ensure sustainability. Education has been identified and reported as an important driver of change. As posited by UNCED (1992), education is critical for promoting sustainable development and improving capacity of people to address environmental issue.

Hans Van Weenen (2000) found that education is humanity's best hope and most effective means to achieve sustainable environment and development. Institutions of higher learning are challenged to produce solutions to problems arising from environmental abuses. Qualitative education equips people from poor families with literacy, numeracy and problem-solving skills and paves way through better understanding of the intimate relationship between environment, ecology and sustainable development (Etim, 2015). By equipping young people with the relevant capabilities in addition to their environmental knowledge, they can excel at living lives aimed at caring for and respecting our planet's resources (Nayar, 2013). The extent of environmental usage by rural farmers depends to a large extent on their level of education and environmental information. Schwarte (2008) posited that access to environmental information is increasingly important especially, in countries where people rely chiefly on natural resources. In order to formulate policies aimed at ensuring environmental management, an understanding of the role of education in managing the environment is required. In this paper, environmental management–higher education relationship and its underlying determinants were investigated using Probit model.

Methods

This study was carried out in Akwa Ibom State, Nigeria. The state which lies between latitude 4033' and 5033' North and longitude 7025' and 8025' East has a population of 3.6 million (NPC, 2006). It is circumscribed to the North, East, West and South by Abia State, Cross River State, River State and the Atlantic Ocean respectively. The state has six (6) Agricultural Development Programme (ADP) zones namely: Oron, Etinan, Uyo, Eket, Ikot Ekpene and Abak. It is located in the rainforest belt and characterized by heavy rains as the annual precipitation ranges between 2000-3000mm. The predominant occupations of most inhabitants of the rural communities are farming and fishing. Multistage sampling technique was used to select the representative farmers for this study. First, in order to give a good representation and avoid biases, 3 out of the 6 ADP zones were randomly selected. Secondly, 20 villages per ADP zone were randomly selected to make 60. Thirdly, 3 farmers were randomly selected per village to

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make a total of 180 farmers. Primary data used for this study were obtained for a period of 6 months from July 2016 to December, 2016 using questionnaires.

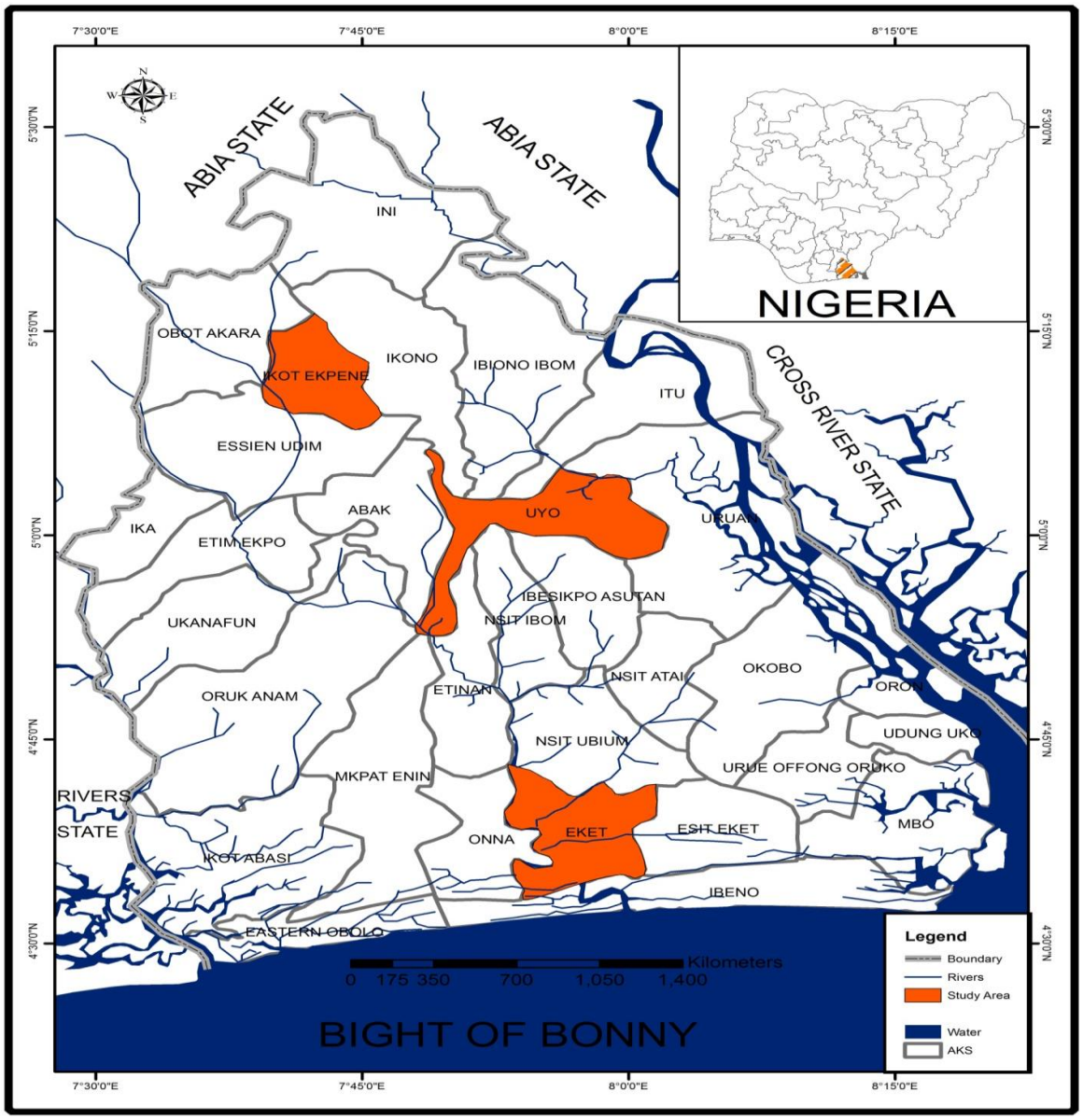

Figure 1. Map of Akwa Ibom State showing Location of Study

Model specification and Analytical Technique

To estimate the role of higher education in managing the environment, univariate probit model was used to identify key factors including tertiary education likely to affect farmers decision to adopt environmentally friendly practices.

Table 1. Description of Variables used in the Analysis of the Decision to Adopt an Environmentally-Friendly Practice

Variables Independent	**Description**
Dependent DTA	Decision to adopt environmentally friendly practices (1=yes, 0=no)
Sex	Sex of the farmer (1=Male, 0= Female)

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Age	Age of the farmer in years
No formal Education	No formal schooling
Primary Education	Years in primary school
Secondary Education	Years in secondary school
Tertiary Education	Years in tertiary or higher institution
Land Tenure	(D = 1 for ownership of land, 0 for otherwise)
Access to Environmental	
Information	(D = 1 if yes, 0 if otherwise)
Labour	Labour employed in man days

Theoretical Model

A univariate PROBIT regression model was used to identify key factors most likely to affect the decision to adopt environmental management practices. According to Etim and Dumkan (2016), this model has found several applications in the literature. The model is expressed mathematically as:

$$\phi(\beta x_i) = \int_{-\infty}^{\beta x_i} \frac{1}{\sqrt{2\pi}} \exp\left[\frac{-t^2}{2}\right] dt \quad - \quad - \quad - \quad - \quad (1)$$

Where $\phi(\beta x_i)$ is normally distributed and represents the probability that the ith individual decide to adopt a given environmentally friendly practice. β is a vector of unknown coefficients; X_i is a vector of characteristics of the ith individual; t is a random variable distributed as a standard normal deviate; exp is the exponential function. The probability of adopting a new practice is the area under the standard normal distribution curve lying between $-\infty$ and βXi. The larger the value of βX_i, the more likely an individual decides to adopt an environmental management practice.

Empirical Specification: The univariate PROBIT model is used to identity key factors likely to affect farmers decision to adopt environmentally friendly practice.

The empirical model for decision to adopt environmentally friendly practice is specified as;

$$Yi^* = P(Y_i = i) = \beta X_i + \varepsilon i \quad - \quad - \quad - \quad - \quad - \quad (2)$$

Where Y_i is the "decision to adopt DTA an environmental management practice, Y_i^*, the estimated value of Y_i, $(Y_i^*=i)$ if $Y_i>0$, and εi is the error term which follows a normal distribution (mean $\mu=0$, variance $\sigma=1$). P is the probability function. β is the vector of parameters to be estimated. X_i is the matrix of explanatory variables that affects the ith farmer's decision to adopt environmental management practice.

The dependent variable Y_i or DTA takes a value of 1 for farmers who decide to adopt environmental management practice.

Results and Discussion

Socio-economic Characteristics of Farmers

Figure 1 shows the sex of the farmers. Majority (66.67 percent) of the farmers were male whereas only 33.33 percent were female.

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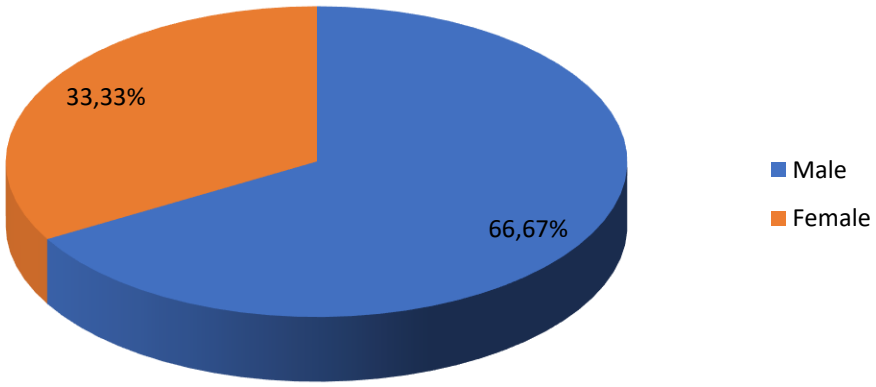

Figure 1. Sex of the Farmer

The age distribution of farmers shows a varied picture. Figure 2 revealed that majority (77.18 percent) of women scientist were within the age range of 41-60 years whereas only 22.22 percent were within the age range of 21-40 years. Result suggest that most of the women were within economically active age.

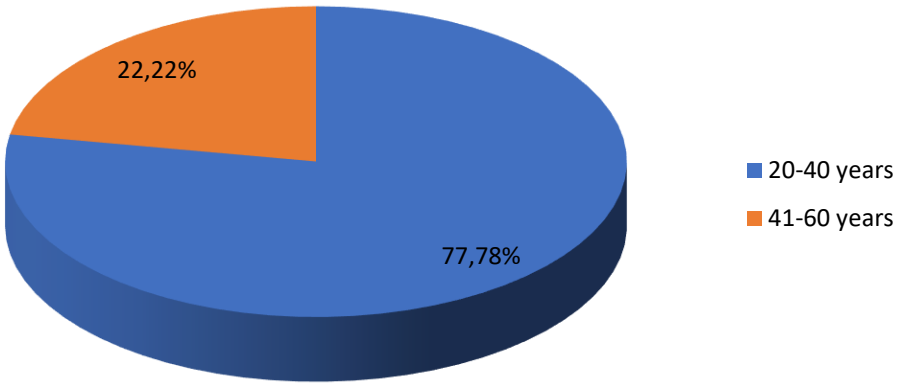

Figure 2. Age of Farmers

The marital status of farmers is shown in figure 3. Most (55.56 percent) of the farmers were married whereas 4.44 percent were single.

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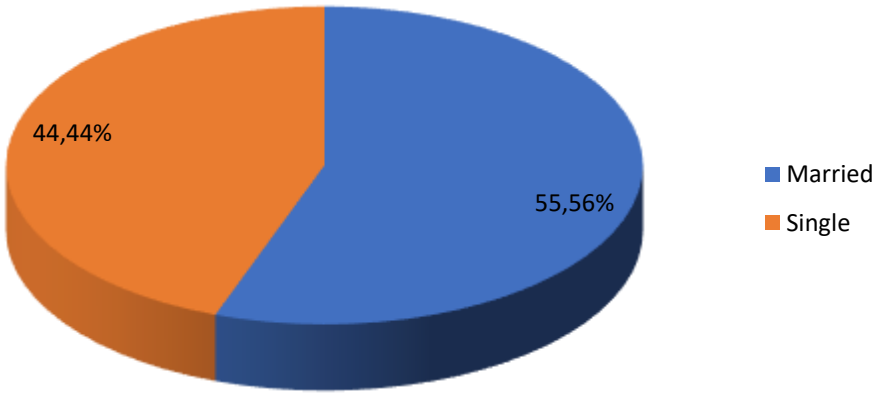

Figure 3. Marital Status of Farmers

The highest educational level of farmers is revealed in figure 4. It reveals that 50 percent of farmers had senior school certificates, 38.9 percent had first degree whereas 15.56 percent had second degrees. Results suggests that most of the farmers were literate.

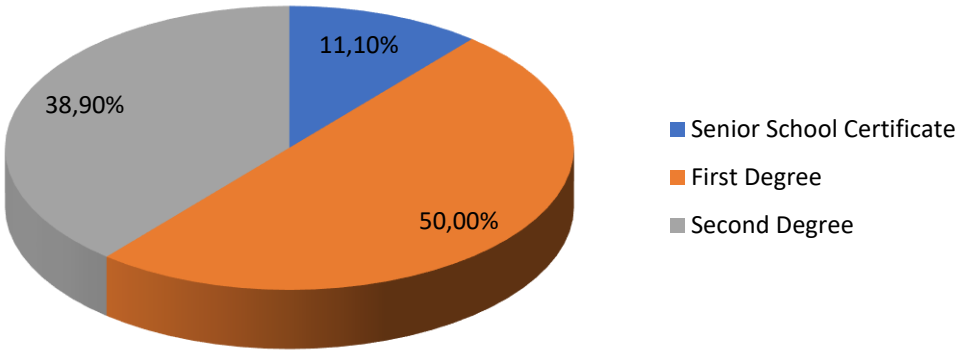

Figure 4. Educational level of Farmers

Figure 5 reveals the years of farming experience. About 5.60 percent had less than 10 years experience in farming, 22.20 percent had 11-20 years experience, 33.30 percent had 21-30 years experience whereas 38.90 percent have been farming over 30 years.

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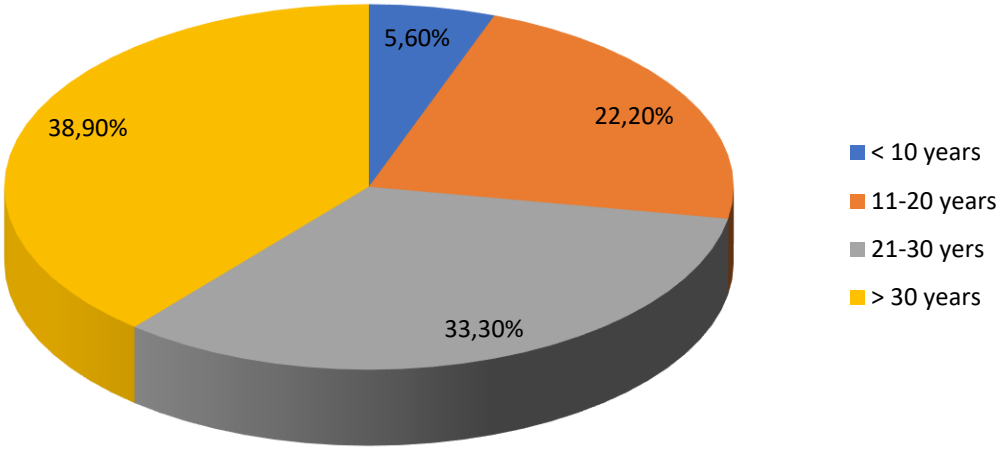

Figure 5. Years of Farming Experience

Probity Model Estimate Results

In the study, farm size of resource poor farmers in hectare is used as a proxy for wealth. From the result, the coefficient of the variable is significant ($P<0.01$). This implies that expanding the size of farmland will likely influence the farmers decision to adopt environmental friendly practices positively. Finding is consistent with similar empirical studies by Etim and Benson (2016) who reported the positive impact of farm size on farmers decision to adopt environmentally friendly practice. Older farmers are less likely to adopt innovations and vice versa. Result in this study showed that age has a positive and significant ($P<0.05$) impact on farmers decisions. Age in this study is used as an index for experience as evidence for human capital indicating that poor farmers with many years of experience have snowballed years of observation and experimentation with different technologies and are more likely to adopt innovations earlier and faster than farmers with lesser years of farming experience. Result conforms with earlier empirical studies by Khai et al (2008); Aye and Mungatana (2010); Etim and Okon (2013) who posited that increasing farming experience improves judgmental evaluation of better production and environmental management decisions.

Tertiary education has an elasticity of 0.0688 and significant ($P<0.01$). Result suggest that farmers who have acquired some form of tertiary or higher education are more likely to adopt and imbibe environmentally friendly techniques or practices earlier and faster than those who have primary or secondary education only. This result support the fact that if higher institutions could provide trained manpower and knowledgeable expertise through environmental education, a number of environmental challenges will be resolved without jeopardizing the use of natural resources in the future. Result also infers that higher education plays a pivotal role in environmental education and awareness by exposing the younger generation to the issues and information on environment. Result corroborate earlier empirical reports by Zegeye et al (2001), Chianu and Tsujii (2004); Chirwa (2005) Etim et al (2013) whose findings support the case that higher education and human capital play a positive and significant place in the obtainment and evaluation of environmental and agricultural ideas.

Access to environmental information has a coefficient of 0.8620 and is positively significant ($p<0.01$). This indicate that farmers with access to environmental information through extension education were more likely to adopt environmentally friendly practices earlier and

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faster than farmers with less access to environmental information. Result conform to the fact that farmers with access to environmental information have a higher probability to adopt knowledge, skills and processes that would give rise to transformed behaviour in support of an ecologically sustainable environment. Finding is synonymous with earlier empirical studies by Schwarte (2008) that natural resources management can be enhanced if the communities are given information and environmental information play a major role in environmental decision making (Haklay, 1999).

Table 2. Probit Estimates of Farmers Decision to Adopt Environmental Management Practices

Variable	Coefficient	Standard Error	z-test	Marginal effect
Constant	0.0941	0.2651	0.3550	-
Sex	0.6821	0.5121	1.3310	0.1443
Age	0.0082	0.0037	-2.2162**	0.0518
No formal education	-0.5713	0.3112	-1.8358*	0.0007
Primary education	0.1133	2.5222	0.0449	0.0426
Secondary education	0.0069	0.0035	1.9714**	0.0136
Tertiary education	0.0815	0.0258	3.1589***	0.0210
Land tenure	0.0144	0.0593	0.2428	0.1186
Access to environmental				0.0625
Information	0.1108	0.0385	2.877***	0.0313
Farm size	0.0365	0.0098	3.7245***	0.2951
Labor	0.1088	0.0954	1.1405	0.1009
Diagnostic analysis				
Mc Fadden R-squared	0.8120			
Log-likelihood	-22.6864			
Normality test	6.1433 (0.0802)*			

Note *, **, *** represent significance at 10%, 5% and 1%

Conclusion

The study was conducted to empirically estimate the relationship between environmental management and higher education. This paper identified higher education as an important driver of change and revealed to play a significant and positive role on farmers decision to adopt environmental friendly and sustainable management practices. Access to environmental information through extension education also positively influenced farmer's decision to adopt environmentally friendly practices. In this study, higher education has been identified as an important driver in managing our environment. Policies to encourage to encourage human capital development and creating awareness on managing the environment through extension education would be sensible policy decisions.

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